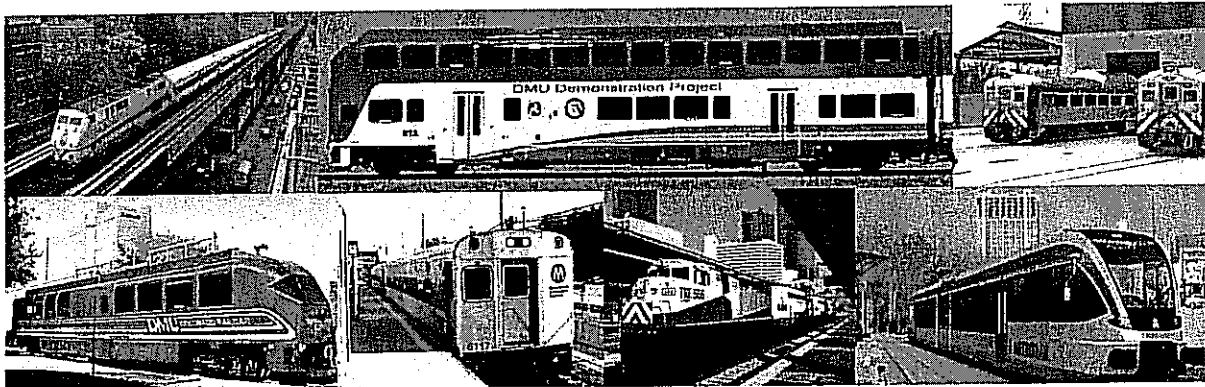


# Galveston~Houston

# ITS

*Intelligent Transportation Systems*

# Commuter Rail Study



*Prepared for*

THE CITY OF GALVESTON



*Prepared by*

THE GOODMAN CORPORATION



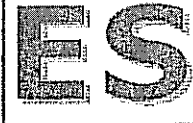
*In association with*

Texas Transportation Institute  
Carter-Burgess  
Larry Smith  
Galveston Railroad Museum

*In partnership with*

Federal Transit Administration  
Union Pacific Railroad  
Burlington Northern-Santa Fe Railroad

*December 2007*



## EXECUTIVE SUMMARY

Forecasts for the Houston-Galveston region indicate rapid multi-county population and employment growth characterized by suburban expansion, increasing freeway congestion, and limited transportation and infrastructure funding to meet these growing needs. Freeway expansion projects along US 59, IH 10, and US 290 are an attempt to accommodate this growth. This often is controversial due to right-of-way acquisitions and multi-year, construction-related impacts to the traveling public and surrounding land uses. IH 45 (Gulf Freeway), as the oldest freeway in the region, has been in one state of reconstruction or another continuously over the last 50 years. METRO's commuter bus services, which are at or near capacity along IH 45, provide some relief from freeway congestion; however, much of the southeast quadrant is unserved by transit. In the last year the Galveston Causeway has been under reconstruction and, more recently, TxDOT has indicated it soon will move into the planning stages of IH 45 improvements inside Beltway 8. The significant delay and cost to society associated with the Hurricane Rita evacuation in the summer of 2005 indicate that surface transportation system capacity movements exceed daily commuter needs. With these overarching regional mobility concerns in mind, this *Galveston-Houston ITS Commuter Rail Study* was developed to investigate the following mobility issues:

- Creation of an efficient alternative to IH 45 for:
  - Relief of commuter congestion;
  - Better accommodation of freight from three ports;
  - Added surface transportation capacity to absorb substantial new growth;
  - Emergency evacuation; and
  - Most cost-effective development of infrastructure.
- Best use of Union Pacific Railroad right-of-way from a regional mobility perspective.
- Passenger connectivity between Galveston and downtown Houston.
- Developing consensus and commitment among multiple jurisdictions.
- Designation or creation of an implementing and operating agency.
- Potential to phase improvements in a meaningful and cost-effective manner.

In examining the broader southeast quadrant of the region, the GH&H/SH 3 corridor provides the greatest potential for congestion relief. The GH&H rail line is the straightest, least-utilized track of the major existing freight corridors in the region and is the only corridor that would likely support both weekday and weekend passenger demand northbound and southbound. It has the added benefit of serving several major workplace destinations, such as UTMB Galveston, Johnson Space Center, and downtown Houston. To the south, Galveston already has established itself as a pedestrian-friendly environment with successful local bus and rail trolley transit services. To the north, Houston METRO provides extensive bus, park & ride, and light rail

transit services with new initiatives planned in the southeast quadrant. At the time of this study, the Houston-Galveston Area Council was undertaking a regional passenger rail connectivity study to provide a broader view of how a comprehensive system of commuter rail might function in five regional corridors. This report, however, provides a more detailed analysis of parameters for developing commuter rail, and its feasibility along the GH&H line, to determine if the City of Galveston, METRO, and their local and regional partners should further pursue this transit mode and carry it into the Federal Transit Administration's Alternatives Analysis phase of development.

### ***Intelligent Transportation Systems (ITS) Demonstration***

Through a congressional discretionary award of \$937,500 (\$750,000 federal/\$187,500 local), the City of Galveston and its project partners, UP, Amtrak, the FTA ITS Office, TxDOT, and the communities along the corridor, conducted a short series of weekend passenger demonstration services (*Texas GulfLiner*) during 2002 and 2003 were held on key holiday weekends, utilizing Amtrak equipment and crews, TxDOT's Dynamic Message signs, on-line ticketing, and existing rail and passenger infrastructure (such as the Galveston Railroad Museum and Terminal, the League City passenger platform, and adjacent surface parking lots). The demonstrations had significant ridership levels, carrying several thousand riders each weekend of operation. For example, approximately 7,000 tickets (85% of all available seats for all runs) were pre-sold for Labor Day weekend 2003. The overall success of the weekend demonstrations underscored that significant public support existed for passenger rail services. Both the City of Galveston and UP ultimately agreed that, due to the success of the passenger rail demonstrations, this study was warranted to address improvement of the line for both passenger and freight activity.



### ***GH&H Rail Line***

The GH&H rail line (*Figure ES.1*), between Galveston and downtown Houston, is among the straightest urban/interurban rail corridors in the United States, is approximately 45 miles in length, and roughly parallels the SH 3 corridor between the Texas City "Y" (intersection of SH 3, SH 146, and IH 45) and IH 610. Beyond the Galveston Causeway Bridge, the GH&H

extends along the south side of Harborside Drive, while, inside IH 610, the GH&H extends north to UP's Congress Yard. The Galveston Rail Causeway Bridge is owned by Galveston County and is operated by the BNSF Railroad. The GH&H line has served as a critical lifeline for transporting freight and passengers between Galveston and Houston for more than 140 years. Today, the line stands as an underutilized transportation and freight asset that potentially could be upgraded to better serve freight, future commuters, and even evacuees in times of emergencies. The southeast quadrant is among the most important to the region from a connectivity standpoint, since it provides north-south access to several regional port facilities, Ellington, the NASA/Clear Lake area, downtown Houston, and Galveston.

### Other Corridor Alternatives

In undertaking this study, an analysis of other parallel facilities such as IH 45, SH 146, and SH 35/SH 6 was conducted to assess the potential commuter travel demand for rail or bus services. IH 45, which already hosts commuter bus services between Beltway 8 and downtown Houston via the high-occupancy vehicle lane, was considered as a capital alternative to include expanding the existing HOV to a full bus facility between Galveston and Houston at a cost in excess of \$2.2 billion. Other alternative corridors studied include SH 146 and SH 35/SH 6. The alternative rail and roadway corridors are indicated in *Figures ES.1 and ES.2*.

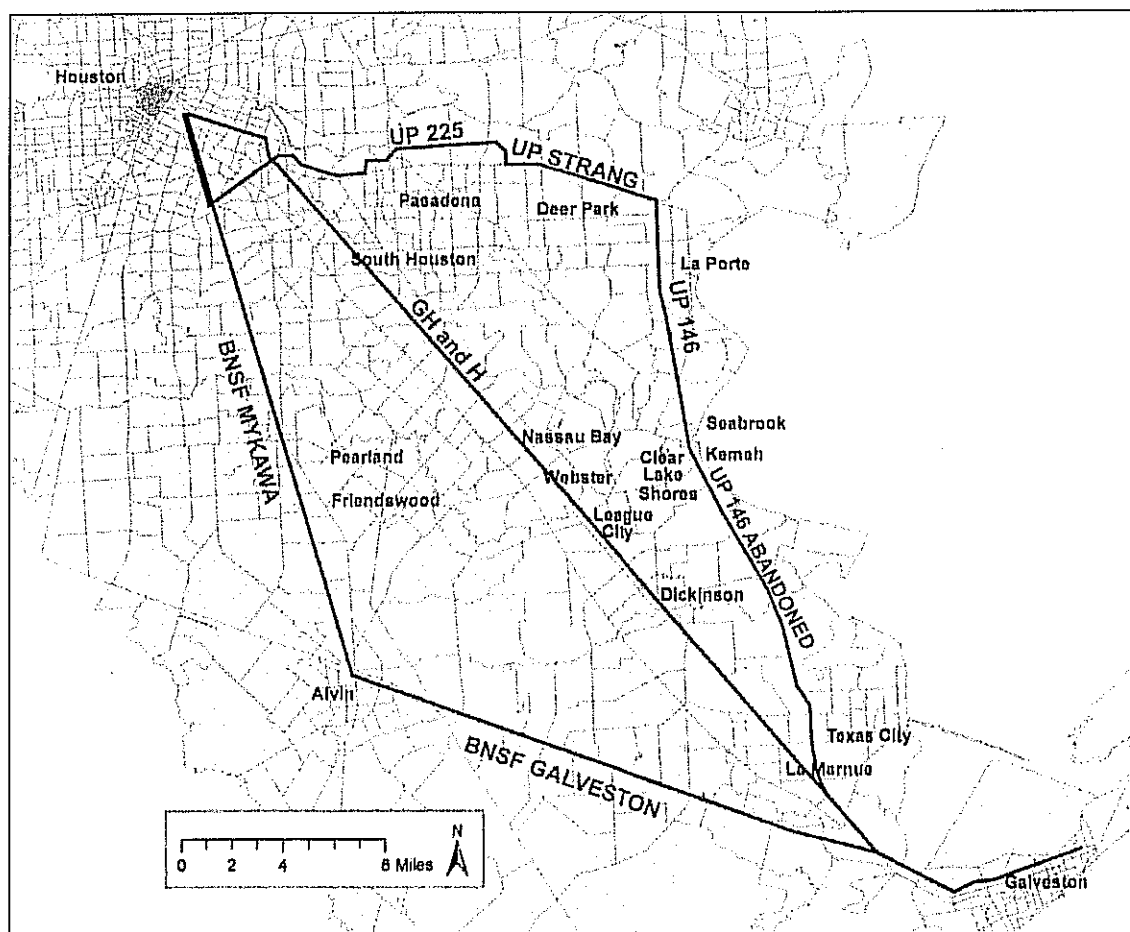
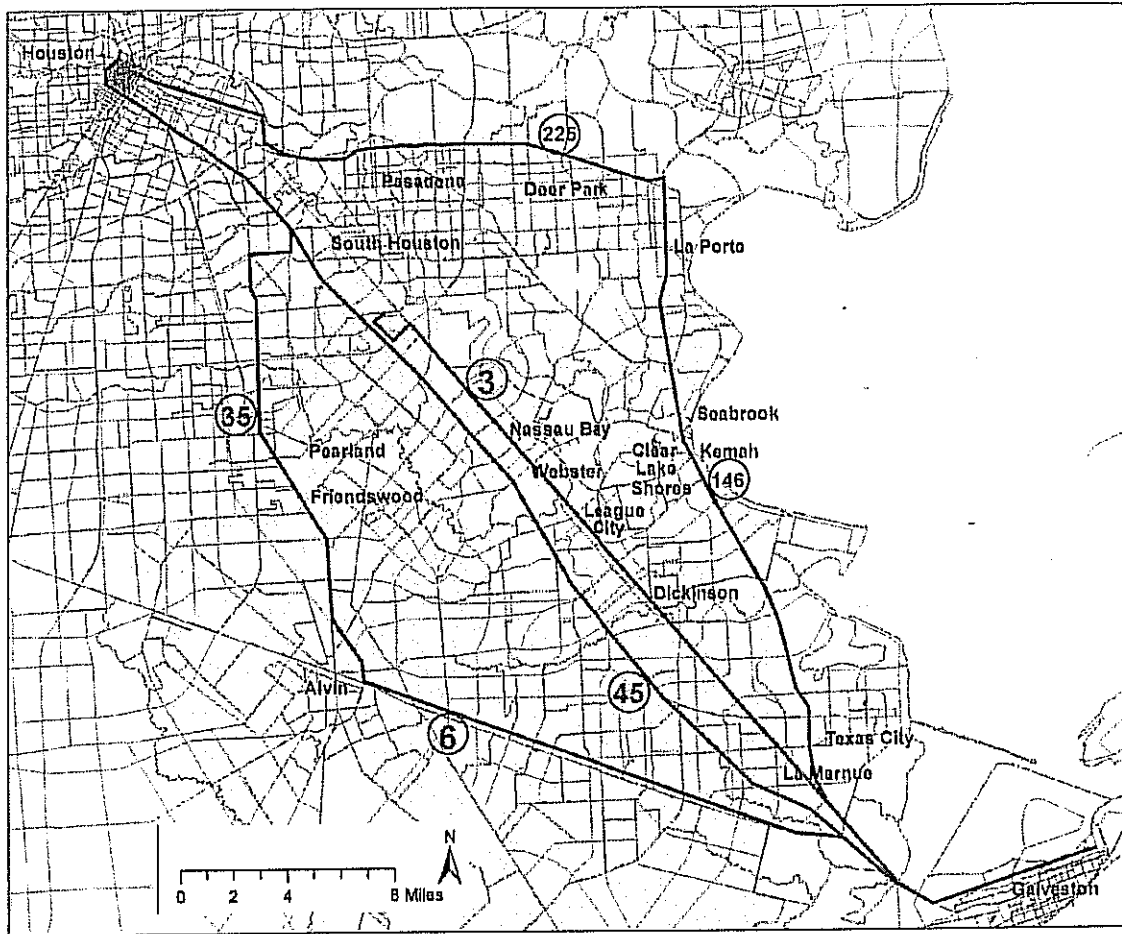


Figure ES.1 – Alternative Southeast Quadrant Rail Corridors



*Figure ES.2 – Alternative Southeast Quadrant Roadway Corridors*

This study concludes that the most viable alternative for additional transit capacity, in terms of ridership, cost, minimal construction impacts, and connectivity, is the GH&H commuter rail alternative within the existing UP right-of-way (*Figures ES.3 and ES.4*). Improvement of the GH&H line for commuter rail services would:

- Cause fewer disruptions to the community and commuters during construction and upgrade than expanding IH 45.
- Result in reduced SOV traffic congestion along IH 45 and SH 3.
- Permit METRO's existing commuter bus routes to remain in operation along IH 45, thereby enhancing rather than replacing existing commuter services.
- Provide more emergency evacuation capacity than an expanded IH 45 freeway corridor, due to a separate right-of-way.

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## **Alternative Alignments**

Three alignment choices inside IH 610 and two alignment choices in Galveston were examined to determine the most successful alignment for commuter rail. These alternatives were examined in an attempt to provide the best accommodation for freight while providing the best service to needed passenger destinations along this most heavily used section.

- On Galveston Island weekday passenger demand to UTMB potentially could be served by utilizing other UP or BNSF on-Island track to access Port of Galveston track, north of Harborside Drive, to ultimately terminate near UTMB at 10<sup>th</sup> Street. Similarly, weekend tourist demand to The Strand area would benefit from direct access to the Galveston Railroad Museum and Terminal.

There is more than one alternative inside IH 610 to connect from the GH&H right-of-way to downtown Houston, Texas Medical Center, and other workplace destinations (*Figure ES.3*). The two most viable alternatives include:

- Remain on the GH&H line inside IH 610 to METRO's proposed intermodal facility at Congress Yard, where passengers can transfer to METRO's local distributor services.
- Switch to an old Southern Pacific right-of-way just inside IH 610 near Woodvale Street, to provide connectivity to the Harrisburg corridor, which METRO plans for LRT (yellow line on *Figures ES.4 and ES.5*).

Under both alternatives, passengers would be required to transfer to other local services to reach their final destinations. At this time the goal is to provide connectivity to other METRO services at Harrisburg or at Congress yards.

There might be the potential, in either case, to provide an opportunity for interlining with diesel multiple units, from the commuter rail line connecting to the METRO planned LRT line. From a design standpoint, the primary DMU issues would be the height and clearance for the passenger platforms along any LRT track that would be used. Most passengers would still need to transfer, continuing along the Harrisburg line into downtown Houston, to access the Main Street line or local bus services.

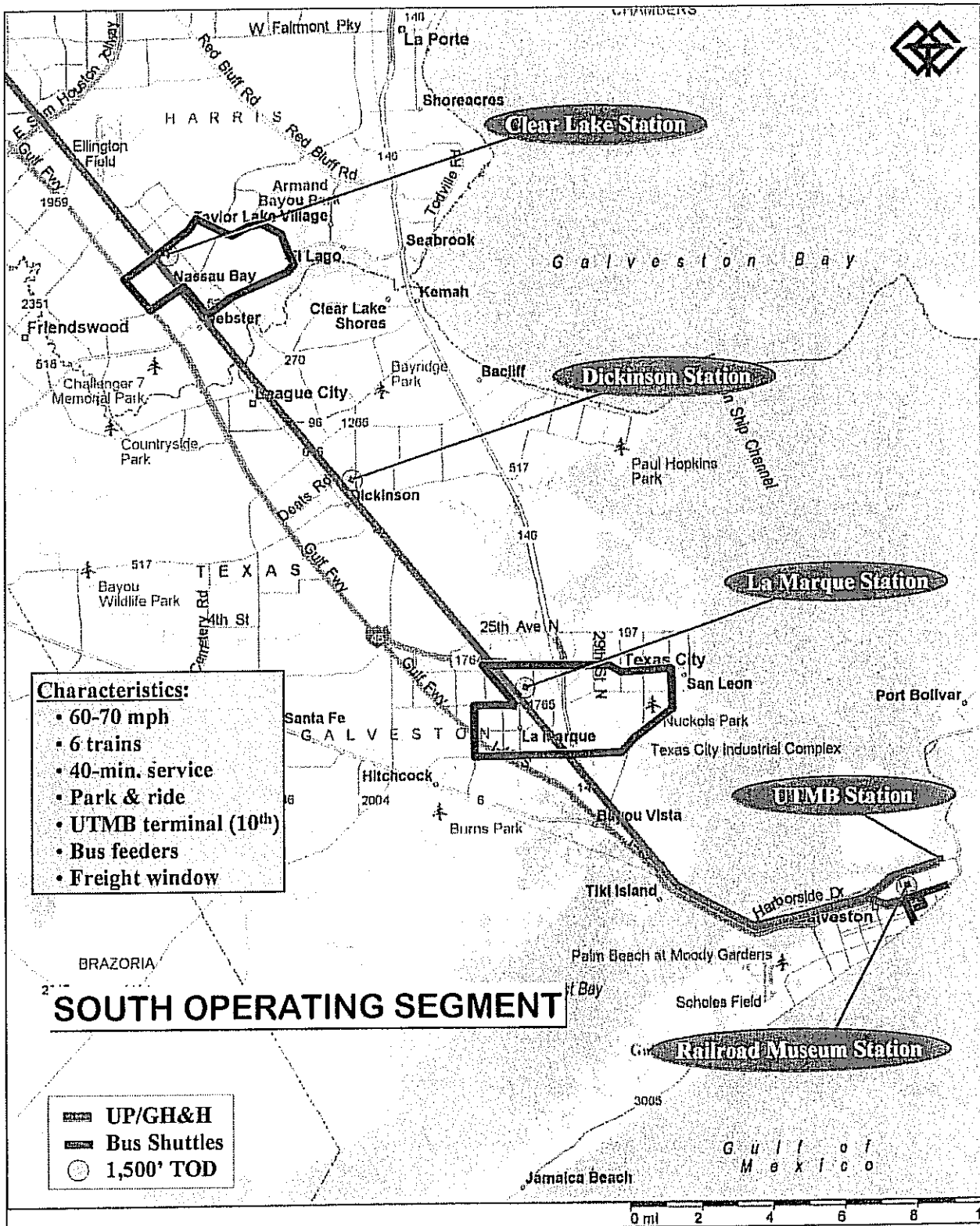
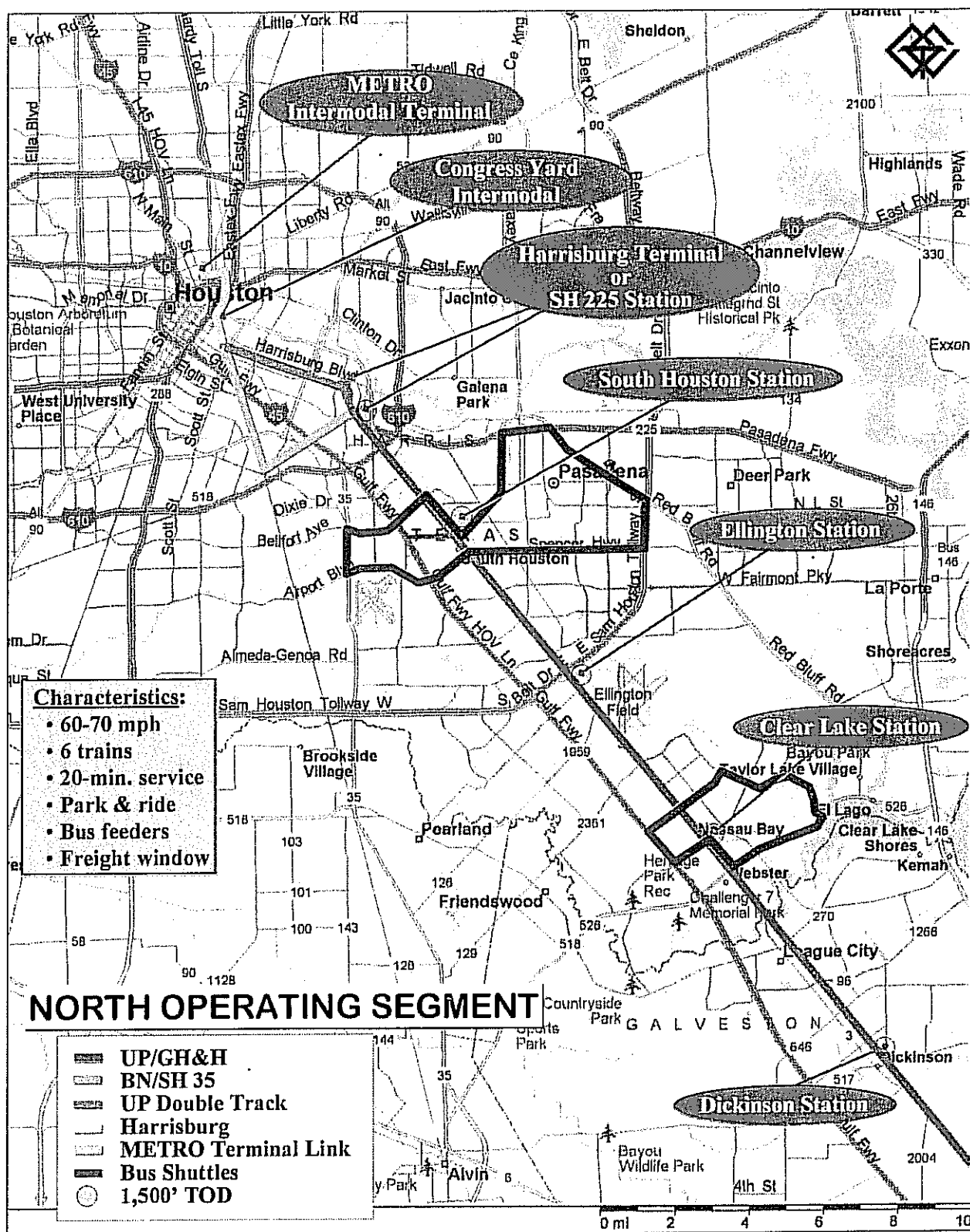


Figure ES.3 – South Operating Segment



**Figure ES.4 – North Operating Segment**



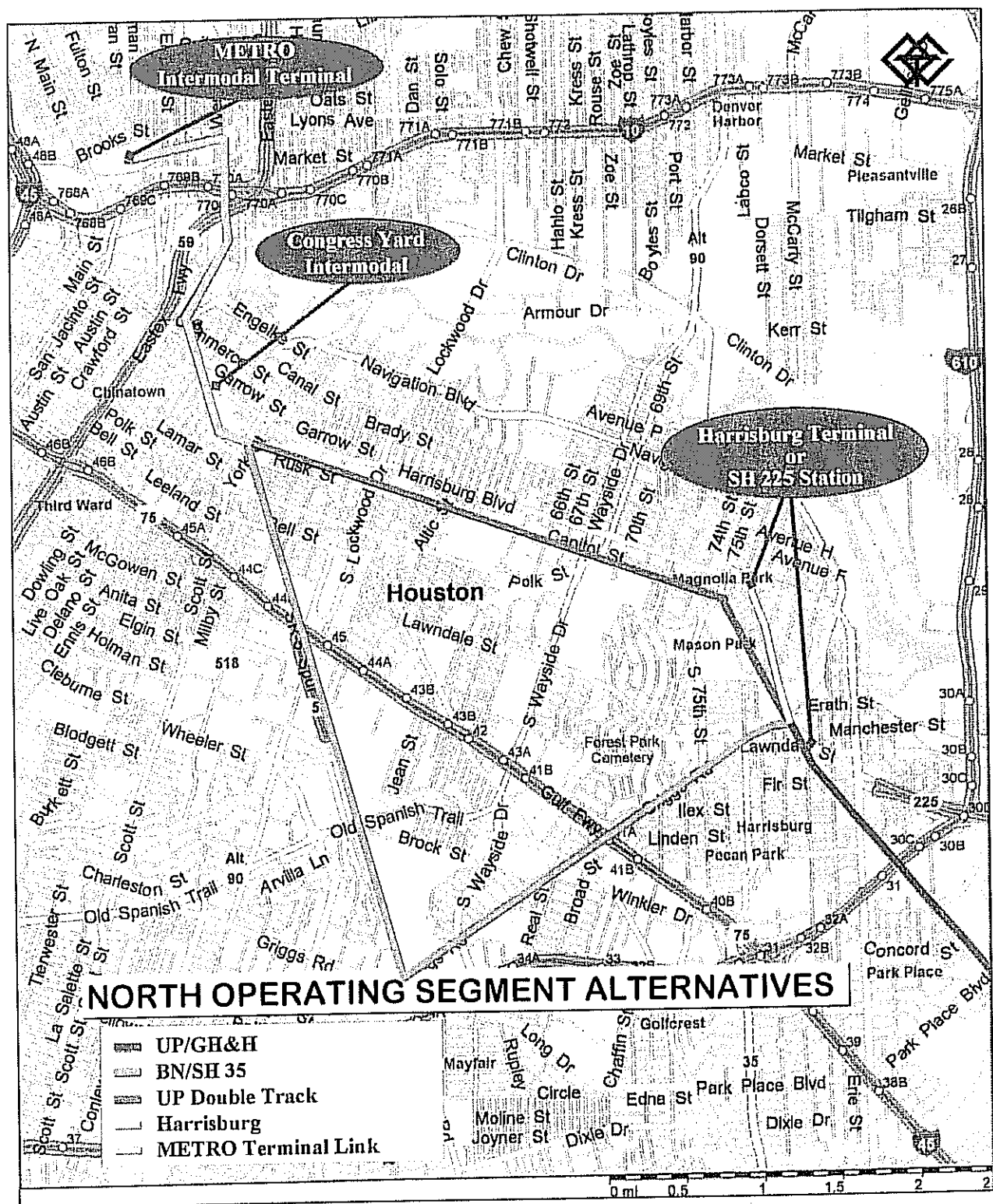


Figure ES.5 – Closeup of North Operating Segment

## Estimated Passenger Demand

The project team worked closely with Houston METRO and H-GAC throughout the process of estimating passenger demand and running METRO's long-range travel forecasting model. Two initial segments were considered for a first phase to be operable as soon as 2012. One would provide northbound service (Dickinson to downtown Houston) and one would provide southbound service (Clear Lake area to Galveston). The ridership estimate of approximately 11,500 trips per day in 2030 assumes upgrade of the GH&H track, controls, and grade crossings between Galveston and downtown Houston. These daily 2012 and 2030 total demand estimates by station are presented in *Table ES.1*.

<b>Table ES.1 – Galveston-Houston Daily Commuter Rail Ridership Forecast</b>			
<b>Year of Service</b>	<b>2012</b>	<b>2012</b>	<b>2030</b>
<b>From Station</b>	<b>Clear Lake Area</b>	<b>Dickinson</b>	<b>Full</b>
<b>To Station</b>	<b>Galveston</b>	<b>Downtown Houston</b>	<b>Service</b>
	<b>South Operating Segment</b>	<b>North Operating Segment</b>	<b>Full Commuter Rail System</b>
Galveston	631		1,239
Clear Lake Area	329	633	2,099
Dickinson	192	193	809
La Marque	110		340
Downtown Houston		950	2,975
METRO Intermodal Terminal		535	1,675
Ellington		303	970
South Houston		193	770
SH 225		165	600
<b>Total Daily Ridership</b>	<b>1,263</b>	<b>2,970</b>	<b>11,478</b>

## Project Benefits

### *Congestion Relief and Improved Air Quality*

There are significant traffic congestion and air quality benefits that are anticipated to result from the introduction of the proposed daily commuter rail services along the GH&H corridor. The estimated 11,478 passenger trips per day, equates to the reduction of 52.1 million vehicle-miles traveled per year. As a result, approximately 617 tons of air pollution will be reduced annually. These benefits would result from reduced weekday, weekend, and holiday freeway vehicle use.

### *Economic Development/Redevelopment*

The implementation of regularly scheduled passenger rail services along the GH&H line will likely result in positive impacts in terms of more efficient land use, increased density, infill development, and redevelopment. Within 1,500 ft. of the transit stations, an estimated \$131 million in property and sales tax values are forecast to be generated over a 20-year period.

### ***Hurricane Evacuation***

One of the great benefits of upgrading the GH&H track for passenger operations is the potential for significant added evacuation capacity for Galveston Island and other storm surge areas of Galveston County. An improved rail corridor to passenger speeds would allow for the staging, loading, and evacuation of multiple trains in a relatively short period of time when compared to the Hurricane Rita experience wherein motorists spent more than 24 hours on the road before reaching their final destinations. In addition, passenger rail affords relative ease and speed in the return of both persons and rolling stock back to the region. Improved commuter rail facilities with adequate in-region rolling stock and locomotive power could deliver 6,900 evacuees to an out-of-region evacuation site, such as Austin, several times a day.



### ***Cost Estimates***

#### ***Capital Costs***

The capital costs for the improvement of the GH&H line includes upgrade of the entire mainline to 79 mph standards between Galveston and downtown Houston. The cost of the two alignment alternatives considered for inside IH 610 differ by \$26.4 million. In both alternatives passengers would be required to transfer to local METRO services for distribution to their final destinations. Harrisburg is the site of a proposed METRO LRT extension.

***Table ES.2 – Summary of Capital Costs***

<b><i>Capital Item</i></b>	<b><i>Congress Yard (millions)</i></b>	<b><i>Harrisburg (millions)</i></b>
Rail & Crossing Upgrade	\$153.0	\$133.1
Stations	\$9.1	\$9.1
Park & Ride Facilities	\$25.2	\$25.2
Rolling Stock	\$140.1	\$140.1
Admin/Design/Mgt.	\$30.7	\$27.6
Contingency	\$53.7	\$50.3
<b><i>Total</i></b>	<b>\$411.8</b>	<b>\$385.4</b>

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### ***Operating Costs***

The estimated operating cost in 2030 for passenger rail services along the GH&H line is \$16.6 million annually.

### ***Phasing Potential***

Based on the potential for northbound and southbound demand, there may be an opportunity for a phased approach to implementation. Two minimum operable segments have been evaluated.

- Southbound (Clear Lake Area to Galveston)
- Northbound (Dickinson to Downtown Houston)

The northbound first phase would have higher capital costs, operating costs, and ridership, compared to the southbound first phase, which would be easier to implement quickly. Building the entire 45-mile corridor between Galveston and downtown Houston would address bi-directional demand. Improving the entire corridor also is critical in addressing evacuation capacity.

### ***Funding and Implementation***

#### ***Local Share***

There are a variety of innovative financing tools available that could be applied to generate sufficient local share funding to support capital activities. These resources include, but are not limited to, the following:

- Creation of Special Districts or TIRZ around stations;
- User fees such as vehicle registration for commuter rail;
- Municipal or County general obligation bonds;
- Exempting transit from the sales tax cap; and
- Donation of land or right-of-way value by the public/private sector.

This study explores local available financial alternatives and the realistic impact they might have in meeting local share requirements for capital improvements. In addition, this study identifies sources of ongoing revenue generation that might be available to support operating costs.

#### ***Federal Funding***

This study provides an overview of FTA's New Starts program criteria, which would need to be met to secure significant levels of federal discretionary funds on a 50% federal/50% local basis. The New Starts program is an increasingly competitive process that requires grantees to meet minimum thresholds for cost-effectiveness and ridership potential in AA and PE phases of project development. Other federal funds that might be applicable for certain aspects of the upgrade of the line are also discussed, such as CMAQ Improvement Program funds.

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## ***Conclusion and Next Steps***

In terms of feasibility, this study identifies reasonable project costs, potential alignment and technology alternatives, and numerous project benefits ranging from reduced traffic congestion to improved evacuation capacity. This study recommends taking the next steps to move the recommended project forward in development, in accordance with federal environmental, engineering, and funding requirements. In summary, there are several next steps to be satisfied for commuter rail in this corridor to advance toward implementation. These next steps include the following:

- Regional/Local Consensus
- AA Phase
- Agreement with UP
- Operating Entity/Organization
- FTA/New Starts Request
- Congressional Delegation Support
- Designation of Local Resources



## GLOSSARY

AASHTO - American Association of State Highway and Transportation Officials

AA - Alternatives Analysis

ACS - American Community Survey

ADA - Americans with Disabilities Act

BAHEP - Bay Area Houston Economic Partnership

BART - Bay Area Rapid Transit

BNSF - Burlington-Northern Santa Fe Railway Company

BRT - Bus Rapid Transit

BTS - U.S. Bureau of Transportation Statistics

CCC - Capital Cost of Contracting

CMAQ - Congestion Mitigation and Air Quality Improvement Program

CO - Carbon Monoxide

CPTED - Crime Prevention Through Environmental Design

CRNA - Coastal Natural Resource Area

CTC - Centralized Track Control

CTPP - Census Transportation Planning Package

DART - Dallas Area Rapid Transit

DHS - U.S. Department of Homeland Security

DMS - Dynamic Message Sign

DMU - Diesel Multiple Unit

DOT - U.S. Department of Transportation

EDC - Economic Development Corporation

EMU - Electric Multiple Unit

EPA - U.S. Environmental Protection Agency

ETJ - Extra-territorial Jurisdiction

FEIS - Final Environmental Impact Statement

FEMA - Federal Emergency Management Agency

FHWA - Federal Highway Administration

FRA - Federal Railroad Administration

FTA - Federal Transit Administration

GH&H - Galveston-Houston and Henderson Railroad

GPS - Global Positioning System

H-GAC - Houston-Galveston Area Council

HOV - High-Occupancy Vehicle

ICTF - Intermodal Container Transfer Facility

IEEE - Institute of Electrical and Electronics Engineers

IH - Interstate Highway

ITE - Institute of Transportation Engineers

ITS - Intelligent Transportation System

JSC - Lyndon B. Johnson Space Center

LCI - Livable Communities Initiative

LRT - Light Rail Transit

ROW - Right-of-Way  
RTP - Regional Transportation Plan  
METRO - Metropolitan Transit Authority of Harris County  
MOS - Minimum Operable Segment  
MPO - Metropolitan Planning Organization  
MSA - Metropolitan Statistical Area  
NAAQS - National Ambient Air Quality Standards  
NASA - U.S. National Aeronautics and Space Administration  
NORTAD - North American Transportation Atlas Data  
NOx - Nitrogen Oxides  
NPDES - National Pollutant Discharge Elimination System  
NRC - National Research Council  
OTC - Optimized Train Control  
PE - Preliminary Engineering  
PPV - Persons per Vehicle  
PTC - Positive Train Control  
PTRA - Port Terminal Railroad Association  
RDC - Rail Diesel Car  
RFP - Request for Proposals  
RMA - Regional Mobility Authority  
RRTD - Rural Rail Transportation District  
SAFETEA-LU - Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users  
SH - State Highway  
SOV - Single-Occupancy Vehicle  
SP - Southern Pacific Railroad  
STP - Surface Transportation Program  
TAZ - Traffic Analysis Zone  
TCMP - Texas Coastal Management Program  
TCRP - Transit Cooperative Research Program  
TCT - Texas City Terminal Railway Company  
TDC - Transportation Development Credit  
TEU - Twenty-foot Equivalent Unit  
TIP - Transportation Improvement Program (TIP)  
TIRZ - Tax Increment Reinvestment Zone  
TMA - Transportation Management Area  
TMC - Texas Medical Center  
TOD - Transit-Oriented Development  
TRB - Transportation Research Board  
TRE - Trinity Rail Express  
TSM - Transportation Systems Management  
TTI - Texas Transportation Institute  
TxDOT - Texas Department of Transportation  
UP - Union Pacific Railroad Company  
UTMB - University of Texas Medical Branch at Galveston  
VMT - Vehicle-Miles Traveled  
VOC - Volatile Organic Compound